



UNITED STATES PATENT AND TRADEMARK OFFICE

NW

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

09/471,981

12/23/1999

EMIKO IGAKI

MTS-3181US

8182

7590

12/08/2003

ALLAN RATNER
RATNER & PRESTIA
SUITE 301 ONEW WESTLAKES BERWYN
P O BOX 980
VALLEY FORGE, PA 194820980

EXAMINER

TRAN, LY T

ART UNIT

PAPER NUMBER

2853

DATE MAILED: 12/08/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/471,981

Applicant(s)

IGAKI ET AL.

Examiner

Ly T TRAN

Art Unit

2853

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 September 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1, 3-539-63, 65-69, 71-82 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1, 4, 5, 40, 41, 43, 51, 53, 54 and 56 is/are allowed.
- 6) ☒ Claim(s) 3, 39, 42, 44-50, 58, 60-63, 71, 76, 81 and 82 is/are rejected.
- 7) ☒ Claim(s) 52, 55, 57, 59, 65-69, 72-75 and 77-80 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 3, 39, 42, 44-50, 58, 61-63, 71, 76 and 81-82 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bartky et al. (USPN 5,003,679) in view of Takuchi et al. (USPN 5,592,042).

- an ink-jet recording head comprising at least one piezoelectric block (Fig.10b);
- Each piezoelectric block (B) has first and second ink pressure chambers (Fig.10b);
- each pressure chamber communicating with a nozzle, first and second partition walls (Fig.10b);
- each partition wall serving as a driving portion for one of the ink pressure chambers, each partition wall including a piezoelectric element and two electrodes (Fig.10b) for driving said piezoelectric element;
- a pressure buffer chamber and first and second fixed walls (Fig.10b);
- The first fixed wall, the first ink pressure chamber, the first partition wall, the pressure buffer chamber, the second partition wall, the second ink

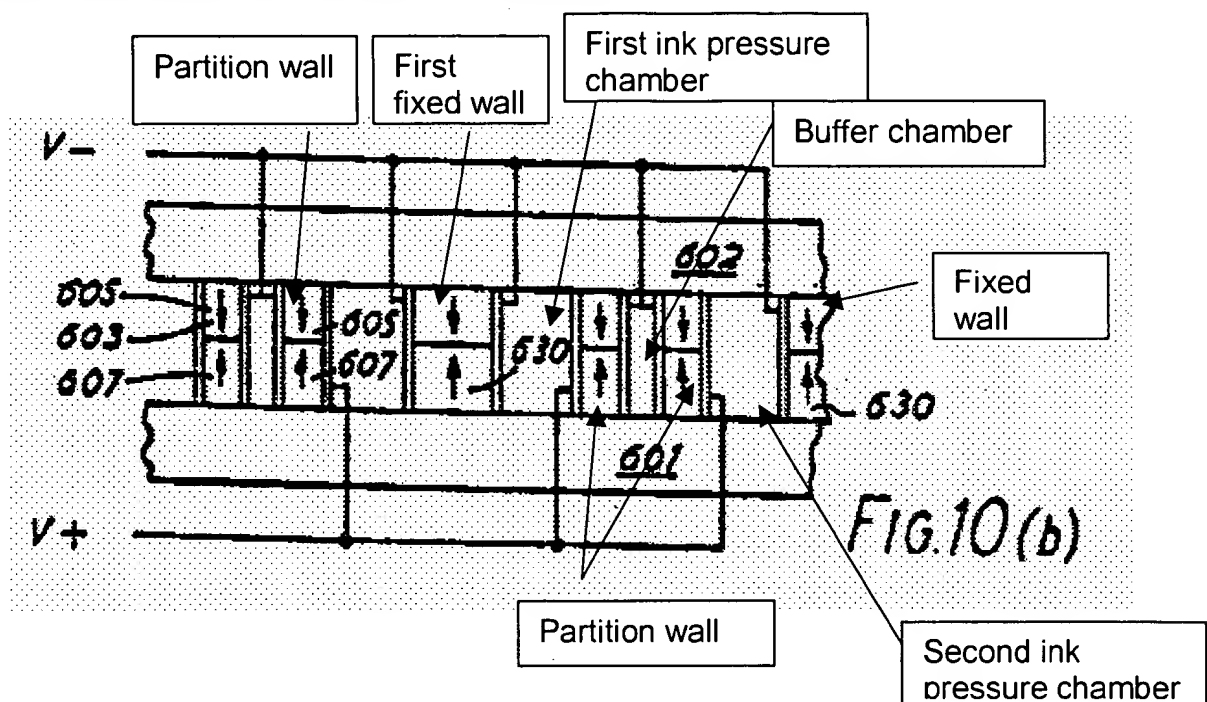
pressure chamber, and the second fixed wall are arranged in sequence along a thickness direction (Fig.10b) and surface of the electrodes are oriented perpendicular to the thickness direction, the driving portion is polarized in the thickness direction and perpendicular to the surfaces of the electrodes (Fig.10b), at least one electrode for controlling, by bending of the electrode, whether the partition wall bend toward a side of the ink pressure chamber or bends towards a side of the pressure buffer

- a plurality of these blocks, arranged in the thickness direction.
- the pressure buffer chambers are all closed on a side at which the nozzle communicating with the ink pressure chamber is open (Fig.10b).
- there are two electrodes per partition wall, one of which is exposed to the pressure buffer and the other exposed to the ink pressure chamber;
- a portion at which the electrodes on a partition wall face each other is included in a portion at which the ink pressure chamber and pressure buffer chamber face each other (Fig.10b);
- the piezoelectric block is an integrally sintered one piece block structure;
- the distance between nozzles appears to be constant (Fig.10b).

Claims 39, 42, 45-50 are directed to how the recording head is produced. So the method claims are not further limit the apparatus claim.

However, Bartky fails to teach at least one of the electrodes is embedded in the wall;

Takuchi et al. show that the electrode is between the piezoelectric portion and embedded in the piezoelectric portion is an equivalent structure known in the art. Therefore, because the electrode is between the piezoelectric portion and embedded in the piezoelectric portion were art recognized equivalents at the time the invention was made, one of ordinary skill in the art would have found it obvious to substitute the electrode is embedded for electrode is in between.



2. Claim 60 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bartky et al. (USPN 5,003,679) in view of Takuchi et al. (USPN 5,592,042).

The combination of Bartky and Takuchi discloses the claimed invention except for the electrode has a mesh-like structure. It would have been obvious to one having ordinary skill in the art to have the electrode has a mesh like structure or any shape for the same purpose such as driving the piezoelectric element, since it has been held that

changing the shape of an invention involves only routine skill in the art. In re Dailey, 357 F.2d 669, 149 USPQ 47 (CCPA 1966).

Allowable Subject Matter

3. Claims 1, 5, 41, 51, 54, 4, 40, 43, 53 and 56 allowed.

The primary reason for the allowance of claims 1, 5, 41, 51, 54, 4, 40, 43, 53 and 56 is the inclusion of the limitation of an ink jet print head comprising a combination of one of the fixed walls is disposed adjacent to the ink pressure chamber and another fixed wall is disposed adjacent to the pressure buffer chamber and each of the fixed walls is more difficult to bend compared with the partition wall. It is limitation found in each claims, as it is claimed in the combination, that has not been found, taught, or suggested by the prior art of record which makes these claims allowable over the prior art.

4. Claims 52, 55, 57, 59, 65-69, and 72-75, 77-80 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for indication of allowable subject matter: each of the below limitations in combination as claimed cannot be made inherent or obvious by the prior art of record:

- a length of the fixed walls in the thickness direction is greater than that of the partition walls in the thickness direction (claim 52).
- each of the fixed walls includes a portion firmer than the partition wall (claim 55).
- each of fixed walls includes a hollow portion (claim 57).
- the pressure buffer chamber to communicate with an air inlet/outlet path connected outside of the recording head (Claim 59).
- both electrodes to be embedded inside the partition wall (claims 65-67).
- one electrode to be further disposed between the two electrodes (claim 68).
- the electrode at the surface exposed to the ink pressure chamber (claim 69).
- a length of one of the electrodes in a direction perpendicular to the thickness direction to be different from a length of the other electrode adjacent to said one electrode in the same direction (claim 72, 73, 74).
- a length of the ink pressure chamber in a direction perpendicular to the thickness direction to be different from a length of the pressure buffer chamber in the same direction (claim 75).
- nozzles are aligned without any overlapping in the direction perpendicular to the moving direction, and $X=P/m$ Wherein X presents a deviation between the nozzles nearest each other out of the nozzles in reference to the moving direction, m presents an integer number of nozzles, and P

presents a distance between the nozzles belonging to the same nozzles alignment (Claims 77-80).

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ly T TRAN whose telephone number is 703-308-0752. The examiner can normally be reached on M-F (7:30am-5pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Meier can be reached on 703-308-4896. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Application/Control Number: 09/471,981

Page 8

Art Unit: 2853

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0967.



November 26, 2003



Stephen D. Meier
Primary Examiner